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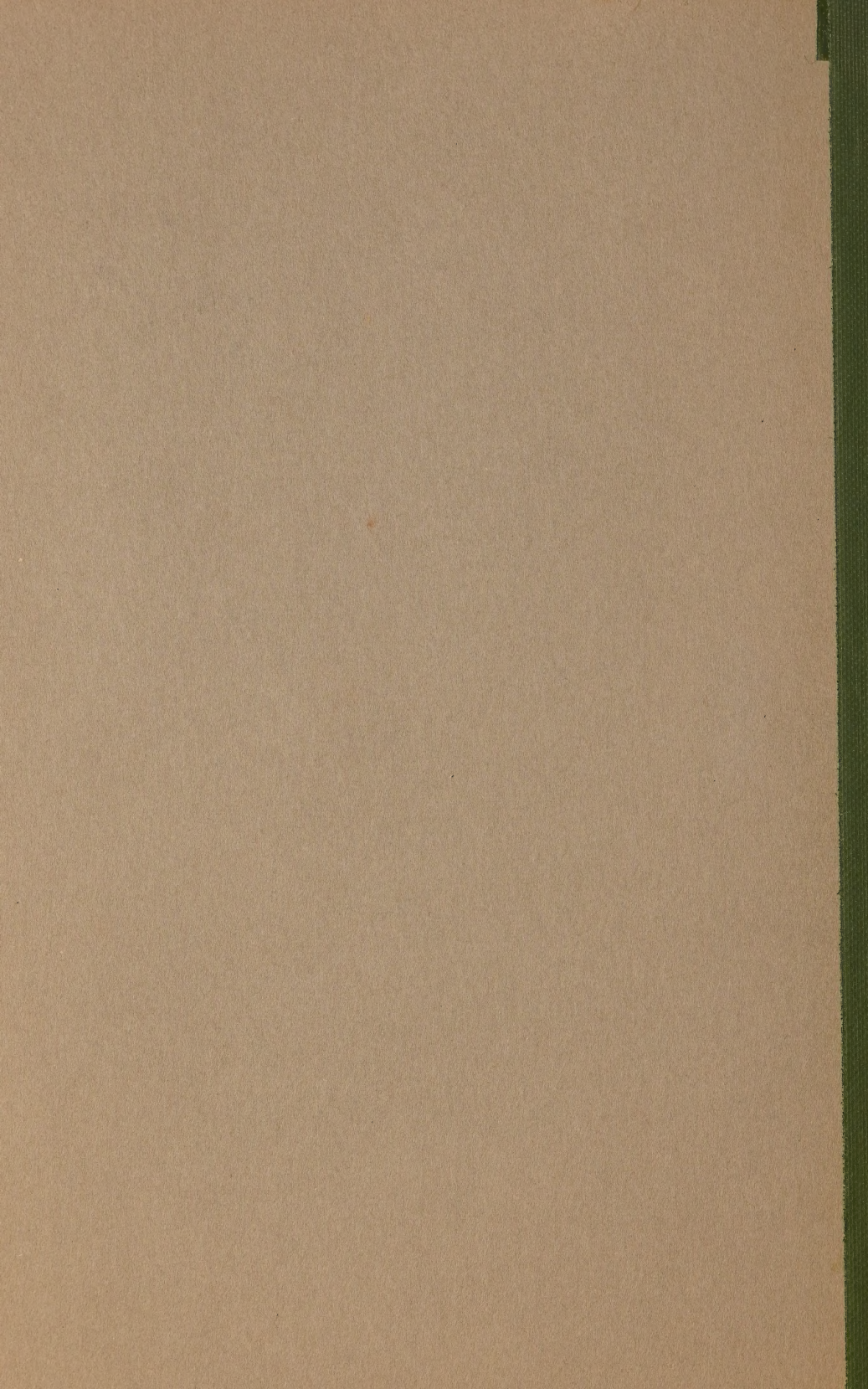
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SPREADS ITS WINGS





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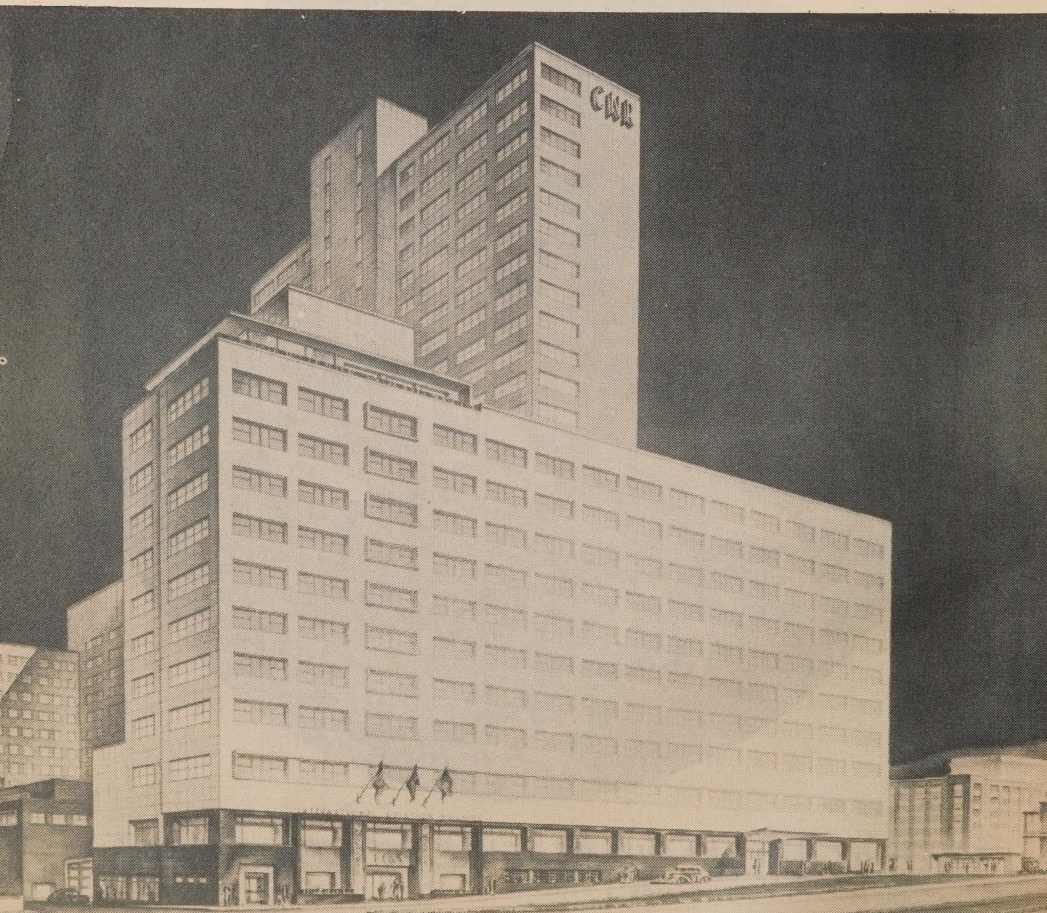
SPREADS ITS WINGS



Today Canadian-made North Star airliners carry Canadians abroad as well as immigrants and travellers to Canada. The aircraft is flying over Ottawa, Canada's capital.

At the right - the Rt. Hon. C.D. Howe, Canadian minister responsible for civil aviation, opens the Provisional International Civil Aviation Organization's first meeting at Montreal in 1945.

Below is the artist's conception of the International Aviation Building at Montreal, future home of ICAO and IATA, which is now being built by the Canadian Government.



A LEADER IN WORLD AIR TRANSPORT

"Need I tell you that Canada intends to play a leading part in world transport by air," declared the Right Honourable C.D. Howe, for many years Canadian minister responsible for civil aviation, before a historic meeting of representatives of the chief flying nations of the globe.

This speech welcomed to Montreal on August 15, 1945, shortly after the surrender of Japan, the first meeting of the Provisional International Civil Aviation Organization (PICAO). In it, Mr. Howe noted the Canadian Government's emphasis on the importance of international air transport in relation to world security. The objectives of the delegates, he said, were to ensure the safe and orderly growth of international civil aviation throughout the world. All present realized the effectiveness of aviation in the foundation of a sound peace, the dreadful threat of a misguided air power, and its potency as a weapon in war.

"Next to the United States," continued Mr. Howe, "Canada is the largest operator of domestic air services in the world. It also maintains an all-the-year-round service across the North Atlantic to Britain. We are only awaiting a peacetime economy to greatly extend our air operations. Our geographical position is such that it is inevitable that Canada will occupy an important place among the nations of the world. The short international routes between the centres of population of the Northern Hemisphere, almost without exception, pass over Canadian territory."

Realizing its vulnerable as well as strategic geographical position in the air world, Canada took a leading part in the formation of PICAO as the postwar agency empowered to

supervise international flying. At the body's permanent home at Montreal since this time, Canada has done much to assure its success in solving many of the problems in its field. During the war, in spite of its relatively small population, Canada became the fourth air power in the world and some 130,000 airmen trained in Canada, most of them Canadians, played an important part in winning the war. Many of them are now participating in peace-time flying in Canada. Canada became the "aerodrome of democracy" during the war and developed already modern air facilities at a cost of millions of dollars. Canada's air services expanded enormously during the war and today are flying three times the number of aircraft miles, carrying five times the number of passengers and three times the amount of mail they did in 1939. "North Star" airliners, chief product of a growing Canadian aircraft industry, are about to blaze new Canadian air routes throughout the world.

EARLIEST FLYING IN CANADA

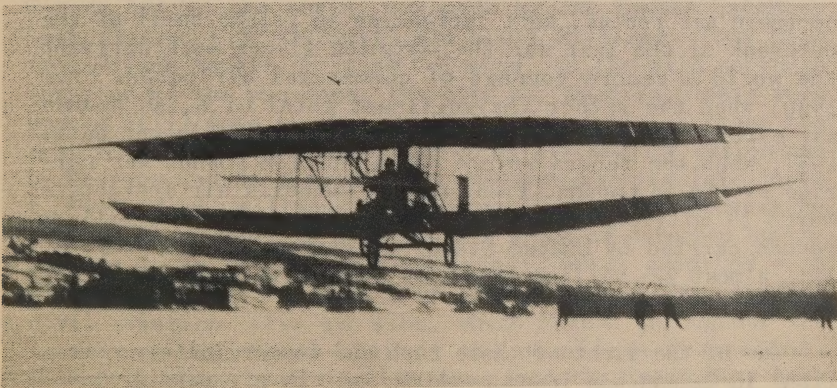
The great interest Canadians have in flying goes back to the early days of flight and of Canada itself. In 1879, twelve years after Canada was formed by the confederation of its separate provinces, a dirigible flight was made at Montreal. Charles Page, with the financial assistance of a retired merchant, R.W. Cowan, built this dirigible, filled it with illuminating gas from the city mains, and by means of a small engine flew 45 miles from the city.

Canada made a substantial contribution to aeronautical science in its earliest experimental stages. Walter Rupert Turnbull's aerodynamic research begun in 1902 in the wind tunnel he constructed in Rothesay village in New Brunswick was the beginning of Canada's aircraft industry. Mr. Turnbull discovered such important laws as that of centre of gravity on aerofoils and made deductions from these laws which explained the longitudinal stability of airplanes. Several aeronautical papers were published by him on his findings. During the first Great War, he showed considerable vision by evolving and developing, with the support of the National Research Council, the electrically-controlled variable pitch constant speed propeller, the fundamental ideas of which are in common use today. At about the same time at the turn of the century, Dr. Alexander Graham Bell, Canadian inventor of the telephone, started experiments with kites and airscrews at his own laboratory in his summer home at Baddeck, Nova Scotia.

This interest in flying and in its scientific development prepared the way for the first known airplane flight in the British Commonwealth. This was made in Canada on February 23, 1909, by J.A.D. McCurdy, who has been active in Canadian flying since and who is now lieutenant-governor of Nova Scotia. Then a young engineer associated in aircraft building with Dr. Bell, Mr. McCurdy flew his "Silver Dart" biplane, which he had designed himself, from the ice of a lake near Bell's laboratory at Baddeck. His flimsy aircraft rose to the dizzy height of 40 feet and covered three-quarters of a mile before its wheels again touched the ice. The "Silver Dart," with such new and important features as three-wheel undercarriage, tapered wings and aileron control, was an advance on any aircraft previously flown.

A year earlier, in 1908, another engineering assistant of Dr. Bell, F.W. (Casey) Baldwin, was the first British and Canadian subject to fly, although the flight in his own designed "Red Wing" was at Lake Keuka, New York. These Canadians, who called themselves the Aerial Experiment Association, were also responsible for another landmark in Canadian flying history, the first recorded flight in Canada by any heavier-than-air craft carrying a passenger. This "Cygnet," which was designed by Dr. Bell, was towed into the air by a steam tug at Baddeck on December 7, 1907. Lieutenant Thomas Selfridge, of the United States Army, another member of the Association, was at the controls.

In 1909 in Nova Scotia J.A.D. McCurdy made the first airplane flight in the British Commonwealth. Here he is in his "Silver Dart" taking off while the skaters behind are trying to keep up with him.



CANADIAN BUSH FLYING

The reputation of Canadian fliers throughout the world was established by the exploits of thousands of young Canadian fliers in the sky battles during the first Great War. More than 4,000 Canadian pilots were trained by the Royal Flying Corps in Canada at this time, forming about one-quarter of its total strength. In addition there were 3,500 cadets in ground training courses at the time of the Armistice. These were large numbers then for a small country.

Led by such "aces" as W.A. (Billy) Bishop and W. (Billy) Barker, many of these wartime fliers looked for a career in Canadian aviation after the war. They naturally turned their attention to bush flying and built up Canada's reputation in this field to world-wide renown. There existed then in Canada large areas of wild country, rich in natural wealth, whose only means of transportation were the canoe and dog sled. Because this country was dotted with small lakes, natural airdromes for seaplanes in summer or skiplanes in winter, flying services rapidly developed. No elaborate weather forecasting or communications facilities were required as most of the flying was done in the daytime and when the weather was good.

Commercial bush flying from the first filled a real economic need in Canada and was able to pay its way without Government subsidy. These swiftly-expanding bush lines were primarily responsible for opening up the northern parts of Canada and greatly helped the development of such major industries as mining and trapping.

Air freight, which had its inception along Canada's northern air routes, kept increasing in volume until at the outbreak of the last war the Dominion fliers were carrying the world's record tonnage of commercial air cargo. From 1920, when the rather insignificant total of 6,740 pounds was carried by air, the loads gradually became larger until 1937, when the record volume of 24 million pounds was carried by air in Canada. Even in 1939 Canadian air freighters moved 19 million pounds, as contrasted to the 9½ million pounds carried by United States carriers the same year. In 1946 almost 23½ million pounds of freight was carried by air in Canada.

One of the first of these bush and commercial air operations in Canada was inaugurated in 1919 by a returning Canadian first Great War flier, Stuart Graham, who now helps to

represent Canada at the International Civil Aviation Organization at Montreal. From a base at *Lac à la Tortue* in Quebec, Mr. Graham began flights in war surplus flying boats for air mapping, timber cruising, air transportation and forest protection, flights which gradually extended over all of Quebec and Ontario. Originally sponsored by the Laurentide Paper Company Ltd., and the local forest protection association, the project was taken over by Fairchild Aerial Surveys in 1922 and later by Canadian Airways Limited.

The Rocky Mountains, once considered a barrier to national unity, were crossed by air for the first time in 1919 by Captain Ernest Hoy. The Canadian hinterland was opened further in 1921 when Imperial Oil Limited established rapid transit communications by air from its southern railway base, the town of Peace River, to its oil wells at Fort Norman on the Mackenzie River. Illustrative of the difficulties overcome on these bush flights was the experience of one of the Imperial Oil pilots who broke his propeller in the bush. A new one was built at a nearby Hudson Bay post from oak sleigh boards and glue made on the spot from moose hide and the pilot was thus able to fly on his way. Another milestone in bush flying was passed in 1924 when two wartime pilots established with war surplus aircraft the first scheduled passenger, mail and freight services by air in Canada. This project of the Laurentide Air Services Limited opened up the rich Rouyn gold area in northern Quebec, which was cut off by 200 miles of forests and swamps, threaded by a single river. Even today Rouyn is a centre for bush flying to the surrounding mining country.

In 1925 the first major prospecting flight, not only in Canada but in the world, was made by two famous Canadian bush fliers, C.S. Caldwell and Scott Williams. They flew from Prince Rupert, British Columbia, to the wild northern interior of the province. The eyes of Canadian miners were opened still more to the possibilities of the airplane the next year when a Winnipeg to Churchill air service was opened by Western Canada Airways. Its promoter was the late James A. Richardson, millionaire Winnipeg grain man. Because he put up enough money to amalgamate a group of detached northern air lines to form Western Canada, he is credited with giving the first "responsible" private support to Canadian civil aviation. This air line, which spread throughout the north country, "grub-staked" the penniless prospector, Gilbert LaBine, by flying him free into the Great Bear Lake area in 1930. There he discovered and staked the Eldorado radium and silver mines, starting the rush to open up and develop this highly mineralized area of thousands of square

miles which later proved a valuable source of uranium.

By the thirties, when Grant W.G. McConachie, veteran bush flier, established the Yukon Southern Air Transport, the Canadian bush lines were firmly established. This particularly important line, which operated north from Vancouver and Edmonton to Whitehorse and Dawson, is now a subsidiary of Canadian Pacific Air Lines (CPA), of which Mr. McConachie is president.

The Federal and Provincial governments of Canada had followed Stuart Graham's early flights with great interest and soon started their own bush patrols by air. The Royal Canadian Air Force, established in 1920, spent more time in aerial surveys, aerial photography and air transportation to remote areas than it did in practising air tactics. One of the recent examples of the Federal interest in bush flying is the Department of Mines and Resources project to survey large areas of Canada for mineral deposits by means of the airborne magnetometer, which also may be used for mapping. Such provinces as Ontario, Saskatchewan, Manitoba, Alberta and British Columbia have been active in bush flying for many years and now operate a fleet of more than 50 aircraft. While Ontario, Saskatchewan and Manitoba operate their own air services, Alberta and British Columbia engage private operators for special work on occasion. The Ontario Provincial Air Services are probably the largest aerial forest fire watching and fighting force in the world. Saskatchewan has recently established an air ambulance service for its citizens in remote areas. The scarlet-coated Royal Canadian Mounted Police are better equipped to maintain law and order over vast stretches of sparsely-settled north country by means of their airplanes.

One of the aircraft Canada produces for bush flying is the widely-known Norseman, seen as it makes a landing on a northern Canadian lake. The large number of these lakes simplify Canadian flying because they make natural landing fields.



CANADIAN PACIFIC AND OTHER AIR LINES AND ROUTES

The biggest bush flying operations today in Canada are those carried on by Canadian Pacific Air Lines (CPA) which flies most of the north-south air routes. CPA was formed in 1942 by the Canadian Pacific Railway (CPR) from ten smaller privately-owned northern air lines. Many small independent scheduled air lines, however, still operate.

CPA serves four-fifths of the area of Canada, which lacks the conventional forms of transportation, railroads and highways. This air line now flies an average of 15,346 miles daily on 9,671 miles of licensed routes. On the main-line CPA planes, the average passenger and cargo is similar to that of most standard air lines, but on the bush air liners may be seen trappers, miners and prospectors who depend on CPA as well as on dog sleds or canoes for their transportation. The company may be called on to carry such cargo as explosives for mining operations, drilling equipment, furniture for new settlements, fresh food, livestock, and everything else that is needed to make life in the north country more like the civilization of the south. CPA now flies the goods from a rail head to a main distributing point in the bush, using wheels the year around. The more difficult bush operations are conducted from this point by small private operators.

One of the greatest air cargo carriers in the world, Canadian Pacific Air Lines transported about 10,818,000 pounds of air cargo, some 1,890,000 pounds of air mail, and some 125,000 passengers in 1947. A total of 5,077,000 miles or 36,596 hours were flown last year. The revenue passenger miles for 1947 were 32,007,836; revenue freight ton miles, 1,166,007; and the mail ton miles, 264,641.

With the help of bush fliers, the Canadian Pacific Railway also helped assure the success of a wartime flying achievement, the so-called Atlantic Bridge. When it was going badly with Britain at the beginning of the war, the idea was conceived of flying sorely-needed American-made bombers across the Atlantic to save time. The late Sir Edward Beatty, president of the CPR, which was then acting in North America on behalf of the British Government to coordinate merchant shipping, brought together a group of Canadian businessmen in Montreal to establish this ferry



Before the last war, Canadian bush fliers were responsible for carrying the world's record tonnage of commercial air cargo. Aircraft, such as the one above, are still opening up the north country. All the freight in the foreground was brought in by air.

service. Captain C.H. (Punch) Dickins, a former Canadian bush pilot and World War I veteran, was given the task of organizing what was then considered to be a very risky operation. The nucleus of a ferry service, partly composed of veteran Canadian bush pilots, was formed. These bush pilots brought to their task a knowledge of the hazards of northern flight possessed by probably no other group of fliers in the world.

The North Atlantic had never before been flown in winter and only a small number of operational flights across it had been made at any time. Ferry flights were started in November of 1940 and next year the Royal Air Force Ferry Command was formed to take over the swiftly growing task from the CPR. As a result of the regular ferrying of thousands of operational aircraft over the North Atlantic in fair weather and foul, the Atlantic flights are now considered routine by Canadian pilots. The experience gained in establishing this ferrying route was useful to the United States Air Transport Command, which pioneered many of the present postwar air routes all over the world.

To service this huge ferrying operation, Canada spent millions of dollars building Montreal Airport, carving out Goose Bay Airdrome in Labrador and helping the United Kingdom to develop Gander Airport in Newfoundland. These airports, among the best in the world, are now busy way stations for the important present Atlantic air operations.

Another northern wartime ferrying route, which also has vast peacetime possibilities as a short cut to the Orient, was provided by Canada at this time with a chain of airdromes. This Northwest Staging Route, linking Vancouver and Edmonton with the Yukon and Alaska, was pioneered by Mr. McConachie for bush flying, and was used during the war for flying American aircraft to Russia. An alternate North Atlantic ferrying bridge, the Northeast Staging or Crimson Route, was also prepared from Regina via The Pas, Churchill, Southampton Island, Frobisher Bay, Greenland and Iceland to Europe. Another new important northern aerial highway follows the Mackenzie River from Edmonton to Fort Simpson and Fort Norman. A chain of airports was built along this route during the war to supply the "Canol" oil development project. All these routes were provided with up-to-date facilities at considerable expense.

TRANS-CANADA AIR LINES

There was adequate surface transportation between Canadian cities after the First Great War so inter-urban air routes were not developed by the Government until later. The success and growth of inter-city air lines in other countries led to consideration of such transportation, and as we shall see, an airport system was growing up in Canada as a result of the fostering of the flying club movement.

The Government, after making exhaustive surveys and preparations, approached the Canadian National Railways (CNR), the Canadian Pacific Railway (CPR) and Canadian Airways Limited (the last being the largest air service then in existence, now a part of CPA) for financial support for a transcontinental air line. For its share, the Government was to provide supervision and set up adequate airports and communications services for the new air line across the country. The Canadian Pacific Railway and Canadian Airways disagreed over the plan proposed for representation and all the shares in the new non-profit venture, Trans-Canada Air Lines (TCA), were bought by the Canadian National Railways. The Government felt that more than one coast-to-coast air service would be wasteful, so according to the Trans-Canada

Air Lines Act of 1937, TCA alone was given the right to maintain such a service. Early the next year, regular trans-continental flying began. Since then TCA's schedules and volume of traffic have grown steadily. TCA is now the leading Canadian air operator.

In 1943 TCA began an Atlantic service for the Government, transporting priority passengers as well as mail and other urgently needed supplies to the Canadian armed forces overseas. This developed into a full peacetime project as TCA has been designated by the Government as the sole Canadian air agency which may operate internationally. In 1947 this service was put under the full control of a TCA subsidiary company, Trans-Canada Atlantic Limited. An interesting recent development by TCA on the North Atlantic is its share in the large-scale movement of thousands of immigrants from the

Technical facilities for flying in Canada are among the most modern in the world. Here a tower control operator blinks permission for an airliner to land.



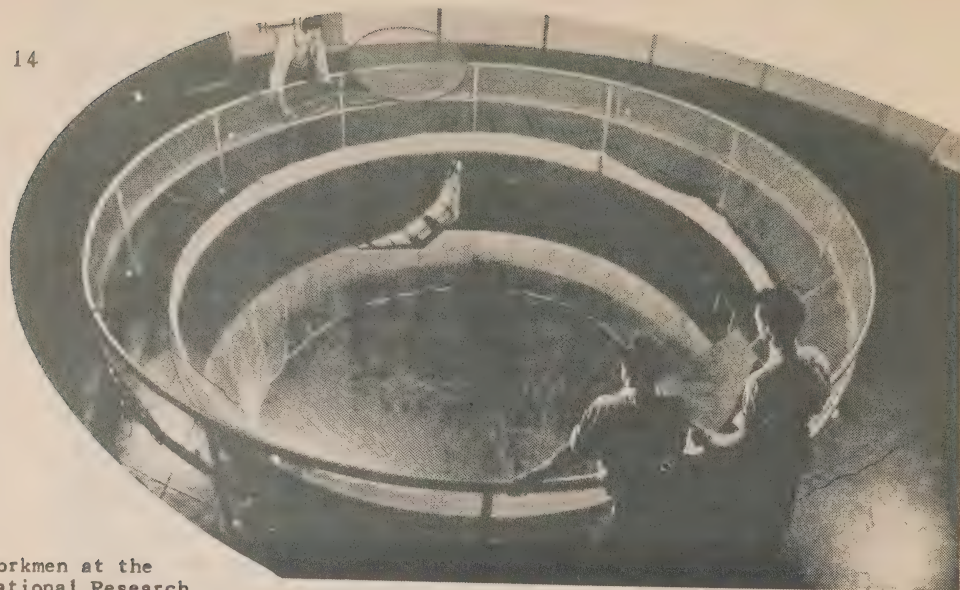
United Kingdom and Europe to Canada, because of the shortage of shipping space.

Regular flights are operated by TCA between Montreal and Shannon, Ireland; Prestwick, Scotland; and London, England, in parallel service with those offered by the British Overseas Airways Corporation. Connection is also made by TCA with several United States cities. New international routes are soon to be established between Montreal and Bermuda, the Bahamas, Jamaica and Trinidad; and later through to South America; and between Vancouver (in cooperation with Britain and Australia) and Australia and New Zealand.

To service this network of routes in cooperation with the Department of Transport, TCA operates its own communications service, with a radio circuit from point-to-point and teletype from coast-to-coast. Constant communication is kept with aircraft from ground to air. An experimental radar station has been established at the Winnipeg operational headquarters, the first of its kind ever undertaken by a commercial air line. TCA has also installed very high frequency (VHF) ground radio installations to communicate with its trans-Atlantic air liners and was the first air line in the world to use Loran radar equipment on an operational basis.

In 1947 Trans-Canada Air Lines had its busiest year. Some 17,930,000 revenue plane miles were flown on more than 11,000 miles of domestic and Atlantic air routes. During the year some 444,000 revenue passengers were carried, an increase on North American routes over the previous year of 40 per cent. The TCA trans-Atlantic service started May 1, 1947. Air express volume in North America rose by 38 per cent over the figures of 1946. Total mail ton miles were 1,483,799; express and cargo ton miles, 1,142,617. On 919 trips across the Atlantic during the year, 15,815 passengers, 271,077 pounds of air express and 111,688 pounds of air freight and 152,179 pounds of mail were carried.

The record of TCA throughout the world for efficiency of operation and safety is second to none. TCA's president is a well-known flier, Gordon McGregor, O.B.E., D.F.C., who fought in the air with distinction against the Nazi Luftwaffe during the Battle of Britain. He heads a large number of last-war fliers who have found employment with TCA and Canadian aviation in general.



Workmen at the National Research Council's aeronautical laboratories at Ottawa study the flying characteristics of a model flying wing built there. A full-scale glider has since been constructed from the information obtained and in time even a powered flying wing might result.

GOVERNMENT AID

The formation and supervision of TCA was but one demonstration of the active interest the Canadian Government has taken in civil aviation. This interest dates back to the time of what was probably the first commercial flight in Canada, early in 1914, when an inter-city air service was started between Toronto and Hamilton. Subsidization of inter-city service by Government mail contracts did not come until 1927 because the Government then felt that surface transportation in settled areas was adequate. As early as 1924, however, the Post Office Department permitted northern air operators to charge for carrying mails, thus helping them establish themselves.

Recognizing the importance to Canada of northern flying, the Government has carried out extensive investigations into its attendant problems, particularly those arising in winter. The Aeronautical Research Committee was formed under the National Research Council in 1920 to give particular attention to the de-icing of flying equipment and the general operation of aircraft in the Arctic. This experimentation, in addition to the practical experience of the bush fliers, has given Canada probably the greatest knowledge of Arctic flying in the world. This is of considerable importance when it is remembered that in the Northern Hemisphere the impor-

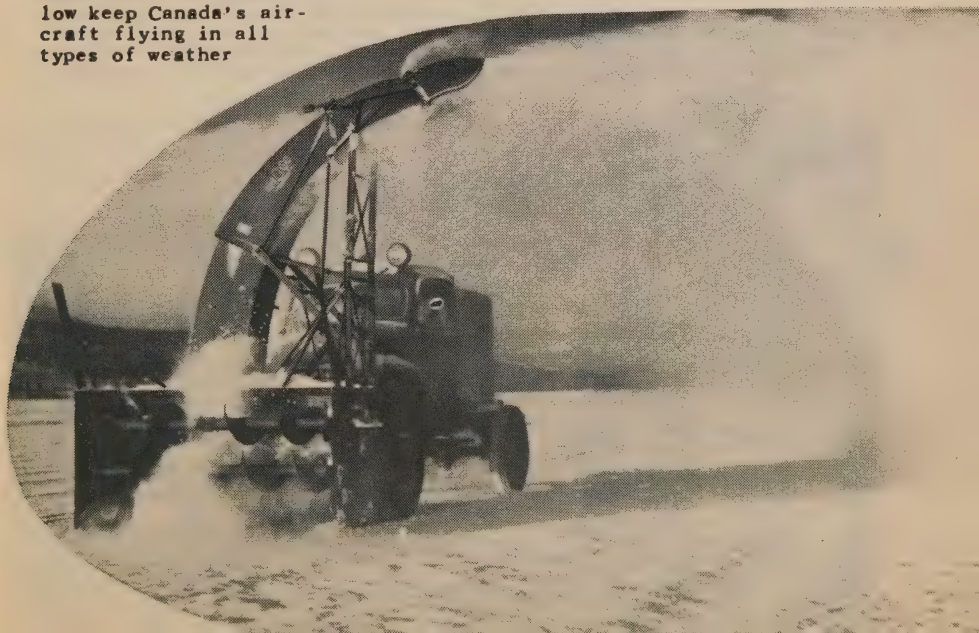
tant aerial highways of the future will pass, almost without exception, over the Arctic.

The National Research Council's aeronautical laboratories, wind tunnels and other testing equipment were tremendously expanded during the war and now are being used to advantage by the Canadian aircraft and other industries. Such important projects are being carried on as research into the behavior of new jet airplane engines under Arctic conditions. Electrothermal de-icing for wings and propellers has been developed. Models of a modern "flying wing" glider and the full-sized glider itself are being test-flown to obtain data which might be useful in construction of powered aircraft. A range of instruments produced for making meteorological measurements is of international interest.

The distance indicator, one of Canada's contributions to radar flying, was developed by the National Research Council and TCA and is now being used experimentally. The Instrument Landing System, by means of which airliners are enabled to land in dense fog, is also being experimented with by TCA test crews, and is being installed by the Department of Transport at several Canadian airports.

A line of fully-equipped, first-class airports has been built and maintained across Canada by the Government 100 miles or less apart connecting the principal centres of

Snow removal is the greatest problem which Canadian airports have to contend with. However equipment like the blower below keep Canada's aircraft flying in all types of weather

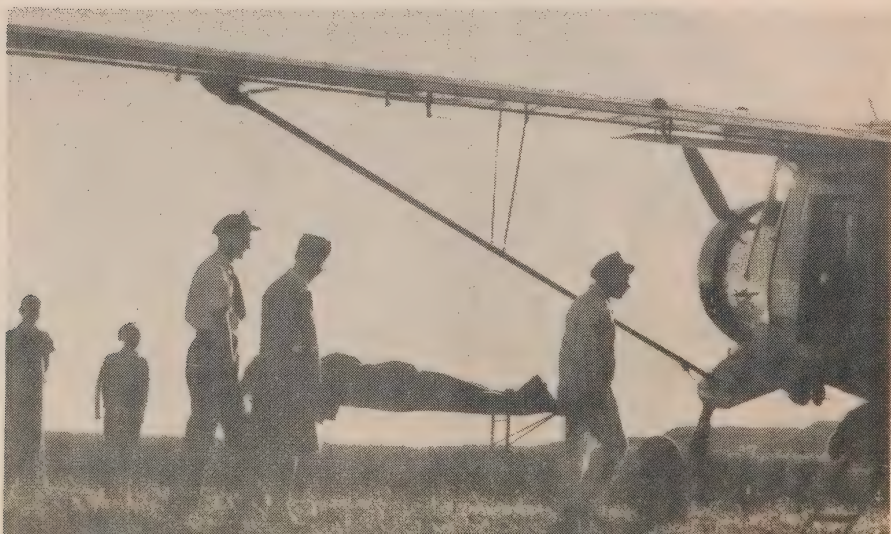


population. These airports were of immense value during the war for the defence of the country, for the training of operational aircrew, and helped in the establishment of Trans-Canada Air Lines. Radio ranges were constructed in connection with these airports providing a safe "let down" in unfavourable weather and making it possible to fly from coast to coast without visual reference to the ground or a magnetic compass. A meteorological staff turned to special forecasts for flying. Problems of maintenance, such as snow removal in winter, were overcome.

In charge of the Civil Aviation Division of the Department of Transport, which now has administrative responsibility for Canadian flying, is the Controller, A.D. McLean. Co-ordination between this Division and those dealing with meteorology and radio communications is maintained by the Director of Air Services, Air Vice-Marshal A.T. Cowley. To assure the proper functioning of air navigational aids and the observance of regulations throughout the country, the Department maintains its own fleet of aircraft.

Another Government body watching over Canadian Civil aviation is the Air Transport Board, set up in 1944 under R.A.C. Henry, its chairman. With two other members, Air Vice-Marshal Alan Ferrier, M.C., and J.P.R. Vachon, Mr. Henry advises the Government on questions of general policy in connection with air transport, investigates and recommends the establishment of new routes, licenses all commercial air transport services, and exercises control in such matters as financial responsibility, schedules, rates and charges and insurance.

Provincial governments as well as that at Ottawa make much use of aircraft for many uses, particularly in remote areas. Here an air ambulance of the Saskatchewan Department of Health stands ready to transfer an emergency case from an outlying farm to a city hospital.



FLYING SCHOOLS IN CANADA

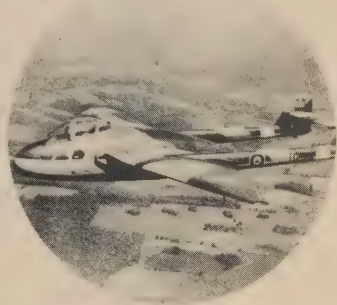
The Canadian Government started the flying club movement in 1927, when it was realized that this would be the best means of stimulating civil aviation. The scheme brought about the building of airports and the providing of facilities for the training of flying personnel. Any community pledging itself to provide the services of an instructor and an air engineer, a licensed airdrome, training aircraft and adequate accommodation for the housing and maintenance of these aircraft was issued other training aircraft by the Government. Each club also received a grant for every student it trained who received a private pilot's certificate.

In 1930 an Association of these flying clubs was formed and an annual Government grant given for the maintenance of a central office. This Royal Canadian Flying Clubs Association has promoted competitions, lectures, air meets and tours. It sponsors a Model Aircraft League, which does educational work among young Canadians. "Canadian Aviation," a well-known monthly flying magazine, was published by the Association for ten years, but now is published commercially. The Association represents Canada in the *Fédération Aéronautique Internationale*, the world-wide private flying body.

At the beginning of 1948, there were 45 clubs across Canada belonging to the Royal Canadian Flying Clubs Association, compared with only 22 before the war. Numerous commercial schools and private clubs,



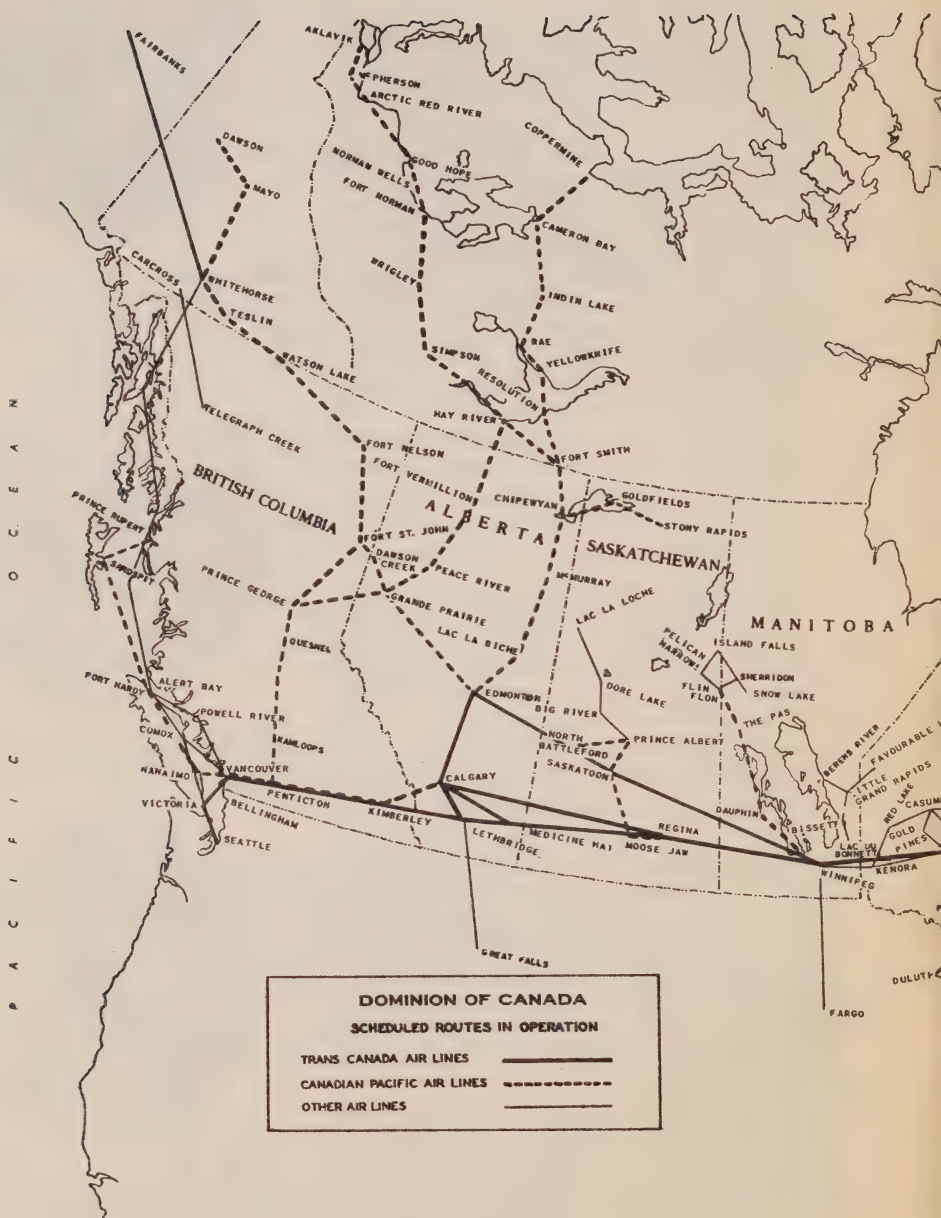
Barbara Ann Scott, world champion figure skater, is also one of Canada's many ardent private fliers.

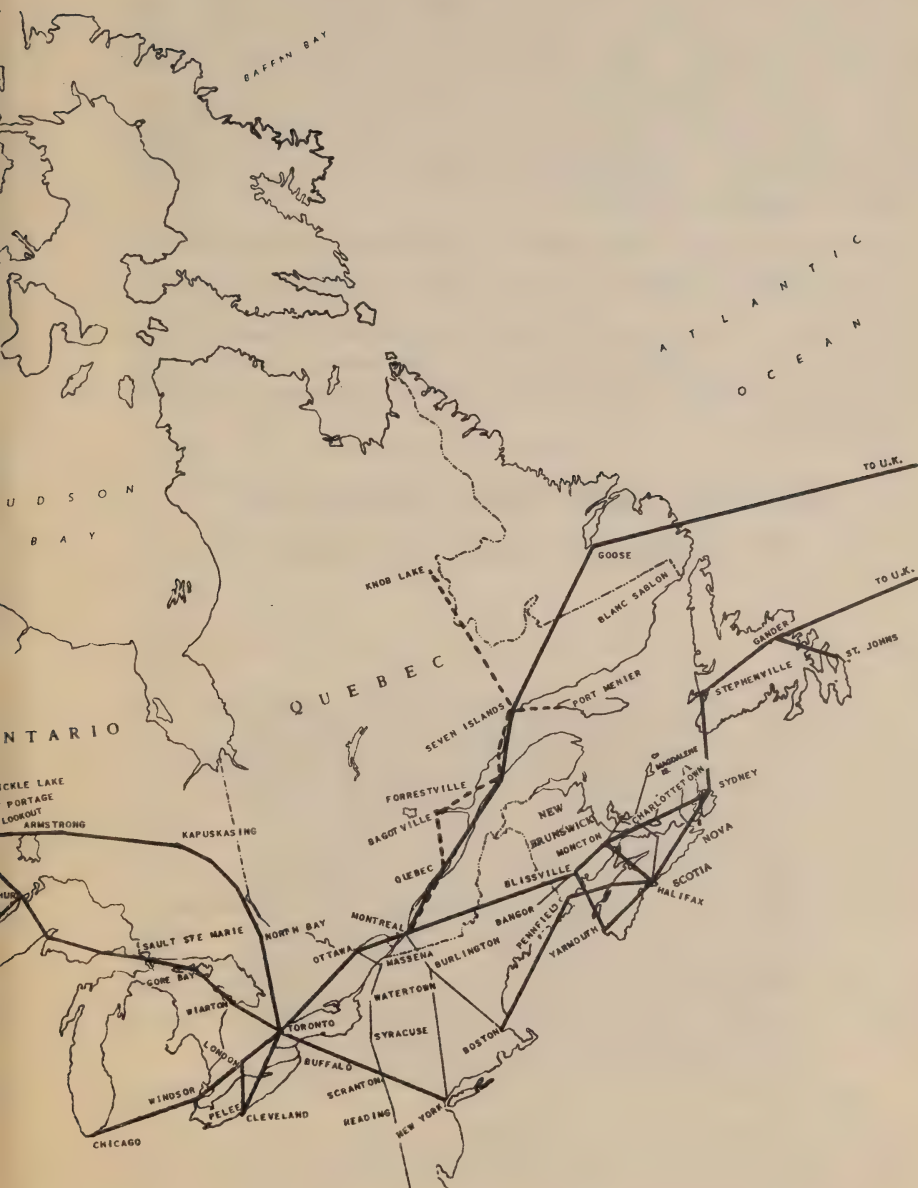


Aircrew in Canada's peacetime air force train in the latest jet aircraft, such as the Vampire shown above.



In the Canadian Navy, pilots learn to take off from and land on the small flight deck of an aircraft carrier.





many of them operated by air force veterans, also give flying instruction. Canadians are also learning to fly with the regular and reserve Royal Canadian Air Force and with the air arm of the Royal Canadian Navy. In 1947 there were some 4,000 pilots licensed in Canada, about one-half of whom were private, the rest commercial operators. In the ten years preceding the war, 5,400 licenses of all types were issued to pilots and 1,300 to air engineers in Canada. In all more than 6,300 private pilot's and 5,600 commercial licenses have been issued to Canadians. Just before the war, there were only about 1,300 licensed Canadian pilots of all types actively engaged in flying.

During the war, the Canadian civil flying clubs and most of the commercial schools ceased their operations entirely. Almost all the clubs that were operating in 1939 were used as schools of Elementary Flying Training for thousands of young Canadian airmen from the Royal Canadian Air Force and from other nationalities in the British Commonwealth Air Training Plan.

THE LAST WAR AND ITS EFFECTS ON CANADIAN CIVIL AVIATION

At the Fall of France in 1940, Canada took over responsibility for building up the gigantic British Commonwealth Air Training Plan (BCATP), which contributed so much towards the Allied victory. The Royal Canadian Air Force (RCAF) was entrusted with the task of converting Canada into what the late President F.D. Roosevelt once termed "the airdrome of democracy" by an agreement signed at Ottawa in December of 1939 by representatives of the governments of the United Kingdom, Australia, Canada and New Zealand. Canada was chosen as the flying training area because of the natural adaptability of its extensive flat territory far from danger of attack but close to the productive might of the United States. Canada's record in the air during the first Great War and its achievement afterwards in establishing sound civil flying were also taken into consideration in making this choice.

The BCATP graduated from its air and ground training schools a total of 131,553 aircrew, about 38 per cent of whom were pilots. Of this number, the RCAF provided 72,835 men or more than 55 per cent. These Canadian fliers served with distinction in Canadian squadrons overseas and also with the Royal Air Force in all its operations. The RCAF

reached a total strength of 206,350 volunteers, many of them highly trained in groundcrew trades. During the war, Canada became the fourth greatest air power in the world, a great achievement for such a small country.

Canada emerged from the war with a large proportion of its population either trained or interested in aviation. In addition, 207 modern airports and airdromes were constructed or improved during the war by the Department of Transport for the BCATP, not counting some 45 airports, airdromes and emergency landing fields owned and operated by the Department. The total number of landing grounds in Canada at the end of 1947 was 273. Canadian flying facilities and techniques such as those for aviation weather forecasts were advanced years ahead of what they normally would have been.

An idea of the general expansion of civil aviation in Canada during and because of the war may be obtained by a comparison of the flying statistics of 1946 as compared with those of 1939. Total revenues increased from \$5,310,000 to \$21,697,000; miles flown from 9,620,000 to 27,179,000; passengers carried on Canadian airlines from 108,000 to 593,280; passenger miles flown from 23,619,000 to 202,222,000; mail from 1,779,000 pounds to 4,915,000; air freight from 19,360,000 pounds to 23,704,000; average load per plane from 781 pounds to 1,770 pounds; number of employees from 1,050 to 5,413; and salaries and wages from \$1,818,000 to \$12,035,000.



Billy Bishop, leading "ace" of the first Great War, also took a prominent part in this last conflict. Here he is giving wings to one of the many thousands of aircrew which Canada trained throughout the war.

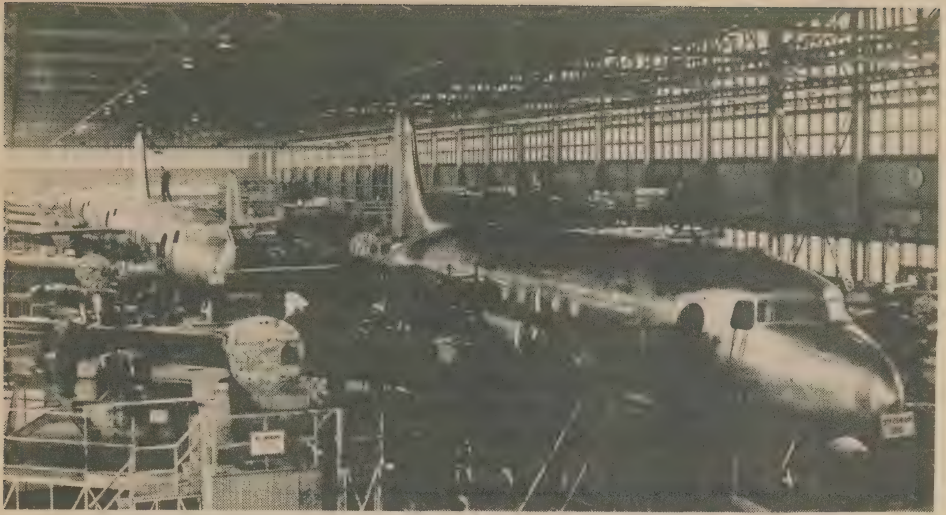
AIRCRAFT PRODUCTION

One particular effect of this last war on Canadian civil aviation is that during this period Canada became the greatest aircraft producer per capita in the democratic world. To supply its gigantic air training program, Canada undertook to manufacture 21 different types of aircraft, ranging from "Tiger Moth" and "Anson" trainers to speedy "Mosquitoes" and "Hurricanes" as well as huge "Lancaster" bombers and "Catalina" flying boats. Each of these was a leader in its particular field, although only two were of original Canadian design. Starting practically from scratch (an output of a hundred or so aircraft a year), Canada produced a wartime total of about 16,000 aircraft. A total of some 100,000 Canadians were employed during the war in manufacturing these aircraft and their accessories.

As a result of the war, Canada has plants capable of producing all types of planes and a superabundance of skilled workers in every field associated with flight. Considerable experience has also been gained in producing aircraft accessories. The major materials in modern aircraft production, such as aluminum, are produced in abundance in Canada. The number of aircraft now being manufactured in Canada, though considerably less than during wartime is more than before the war and the average value much greater.

Probably the most significant development of the post-war production is the 40-passenger "North Star," the flagship of TCA. This second postwar airliner to be put into operation in the world is manufactured for the Canadian Government by Canadair Limited in Montreal. Specifically designed for Canadian conditions, this airliner is a modification of the American Douglas "DC4," incorporating "DC6" characteristics, but four of the more powerful British Rolls Royce engines carry it faster and higher. The "North Star" has a maximum speed of about 350 miles an hour and it is able to fly 3,500 miles without stopping. Being pressurized, it can go as high as 28,000 feet above sea level, high above any bad weather.

The Canadian Government fostered production of the "North Stars" with the view of promoting a vigorous airplane industry as an essential complement to Canada's aviation plans. The "North Stars" are also being supplied to the RCAF as a long-range transport aircraft and are to be used by TCA on



North Star airliners coming off the assembly line at Montreal were designed specifically for Canadian conditions but are also intended for the export market.

its transcontinental and international routes. At first the Government paid a private company to manufacture the airliners on a management fee basis but recently sold the Canadair plant to a United States Company with the intention of cutting down high production costs by opening up the export market for these airliners.

Outstanding among the other aircraft produced by Canada is the "Norseman," an all-Canadian designed plane, which R.B.C. Noorduyn started to build in 1934. This popular aircraft, which has proved itself in bush and wartime flying, is still being manufactured by the Canadian Car and Foundry Company of Montreal. The same company is also now testing their "Loadmaster," a high wing monoplane of the twin boom type with a central cabin. The "Loadmaster," which is made for the export market, is primarily intended to carry freight but is also capable of adaptation as an airliner.

DeHavilland Aircraft Company at Toronto, which also has a successful record producing wartime and peacetime aircraft, is putting out such light freighters as the "Fox Moth," and two Canadian designs, the metal trainer, the "Chipmunk," for world-wide sale, and the "Beaver," which may be used as a cargo carrier.

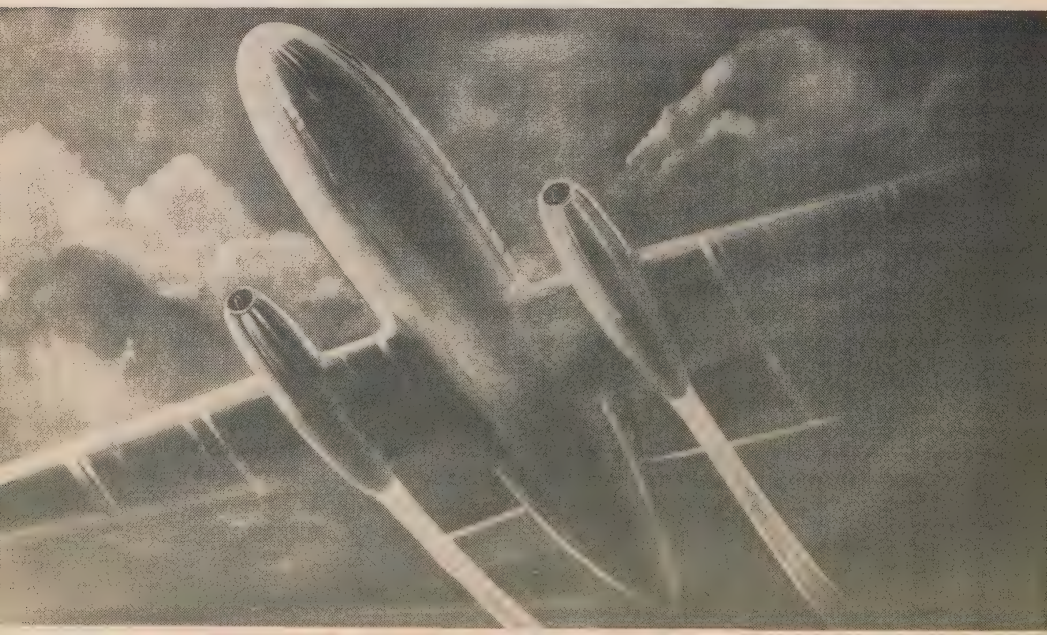
The first Canadian-built helicopter, the "S.G. Mark VI," is now being test-flown by its makers, the Intercity Airlines Company of Montreal, which intends to mass-produce

these machines in Canada for export. The company points out that manufacturing conditions are favorable and there are many uses for helicopters in this country.

Probably the most advanced aircraft being produced in Canada is that at the A.V. Roe Canada plant at Toronto, the 40-passenger airliner, the "C-102," which is to be powered by four Rolls Royce Derwent Mark V jet engines. One of the first jet passenger airliners in production in world, this aircraft is expected to make its first flight soon. The 400 m.p.h. "C-102," with its estimated range of 1,200 miles, is a far cry from the Canadian Vickers "Vedette," the first successful Canadian aircraft to be built especially for Canadian bush flying conditions. The first "Vedette" was made in Montreal in 1924.

Canada has never had an airplane engine industry but now the same company, A.V. Roe Canada, is experimenting with gas turbine and jet engines, the result of Canadian and British research. One of the weaknesses of Canadian wartime aircraft production was that all the engines for the aircraft manufactured had to be imported. The thrust of Avro's "Chinook" turbo-jet engine, the diameter of which is only 32 inches, is claimed to be equivalent to that of 25 automobile engines, each delivering 100 horse power. Each of the six combustion chambers is to be capable of heating about 70 seven-roomed insulated houses in an outside temperature of ten degrees below zero. This engine is but the forerunner of others now in the design stage.

Today at Toronto a jet-propelled airliner is being built, one of the first in production in the world. This is the artist's conception of the speedy 400-mile-an-hour aircraft.



CANADA AND THE FORMATION OF ICAO

Canada signed the 1919 Paris Air Convention setting up the International Commission for Air Navigation, the comparatively small body dealing with international aviation between the two Great Wars, but during this period Canada was mostly interested in building up its domestic flying. This was a time of anarchy in the air, when some countries refused to permit air lines to cross the air space above their territory, necessitating costly detours. Others refused landing as well as transit rights. Air transport became highly uneconomic and lines were heavily subsidized at the expense of the national taxpayers.

During this last war, Canada became actively interested, as we have seen, in flying abroad, and concerned about conditions in this field. Prime Minister Mackenzie King told the Canadian House of Commons on April 2, 1943, that: "The Canadian Government strongly favours a policy of international collaboration in air transport and is prepared to support in international negotiations whatever international air transport policy can be demonstrated as being best calculated to serve not only the immediate national interests of Canada but also our overriding interest in the establishment of an international order which will prevent the outbreak of another war." This speech is the keynote of Canada's aviation policy abroad.

Canada also sought effective machinery for international co-operation in flying. The Canadian Draft Convention on Civil Aviation, the earliest such complete plan, was tabled in the Canadian House of Commons, March 17, 1944. This Draft, representing the type of agreement which the Canadian Government would be prepared to support, provided multilateral granting of Four Freedoms of the Air under an international authority which had power to supervise international aviation and prevent abuses of these Freedoms. Any reversion to the "hard bargaining" of prewar days was considered by Canada to be "unthinkable." The Draft, as approved by the Canadian Parliament, was then improved at the Commonwealth Air Conference in Montreal in late 1944 and at meetings with United States authorities. It served as a basis of discussion at the Chicago International Civil Aviation Conference in November of that year in drawing up the Permanent Convention providing for ICAO.

As we have seen, the first meeting of PICAO, that of its council, was held at Montreal in August of 1945. The energetic work of Canada in preparing for PICAO, Canada's geographical location midway between the Old World and the New, and its interest in well-ordered international flying, were partly responsible for the choice of bilingual Montreal as the permanent seat of the organization at its first assembly there in 1946. PICAO achieved permanent status March 4, 1947, and became simply the International Civil Aviation Organization (ICAO).

The International Air Transport Association (IATA), the rate-making cooperative of more than 70 world air lines, followed ICAO's example in setting up permanent headquarters at Montreal to permit easier collaboration with it. IATA's work has been helped by the efforts of many Canadians, notably H.J. Symington, C.M.G., K.G., until recently president of Trans-Canada Air Lines, who was IATA's first president. Mr. Symington also took a prominent part in the early establishment of ICAO. Because of the presence of these two organizations, Montreal has been called the aviation capital of the world. ICAO and IATA are to share a modern International Aviation Building now being constructed for them by the Canadian Government.

Canada, the United Kingdom and the United States were the only countries at the ICAO Assembly at Montreal in 1947 to be classified as world air powers. They were elected unanimously on this basis to the body's important executive council. These three countries, too, were the only ones which had attended all of the many meetings convened by PICAO to put international civil aviation on a sound footing after the war.

The RCAF's aerial photographic mapping of Canada is one of its biggest peacetime jobs. These war-trained fliers are looking over the day's work. In all, nearly two million square miles of the country have been mapped this way. These maps are made in accord with ICAO recommendations so that they will conform with those of other countries.



CANADIAN WORK AT ICAO

Canadians have also been prominent in the important work being done at ICAO, which, according to Mr. Howe, has made more progress in settling differences between countries than any of the postwar international agencies. Brigadier C.S. Booth, former secretary and legal adviser of the Canadian Air Transport Board, has succeeded Anson McKim as Canadian representative on the ICAO council. Mr. McKim, who is now vice-president of traffic for TCA, was active in the economic work of ICAO, while Brigadier Booth takes a particular interest in its legal work. Stuart Graham, of the Department of Transport, his alternate, is at present chairman of the Air Navigation Committee of ICAO, the ten technical divisions of which formulate international technical standards and recommended practices. Several Canadians have been made chairmen of the technical divisional meetings; Mr. Graham, of the licensing division; C.J. Campbell, of TCA, of the radio technical division; F.H. Peters, Surveyor General of Canada, of the maps and charts division; Dr. J. Patterson, formerly of the Department of Transport, of the meteorological division; J.R.K. Main and J.R. Robertson, of the Department of Transport, of the airdromes and ground aids division. J.C. Lessard, Deputy Minister of Transport, was chairman of the statistics division. Among those Canadians who helped plan the organization in its early stages is P.A. Cumyn, who was chairman of the Canadian preparatory committee which established PICAO. He is now ICAO's assistant secretary general for administration.

By maintaining its domestic flying facilities in excellent condition, Canada is doing valuable service to many other countries, which if they are not using them now will probably do so in the future, because of Canada's strategic geographical position in regard to air routes. Many of the Canadian facilities, indeed, are operated particularly for international aviation.

Canada is taking steps to carry out its share of an ICAO-sponsored agreement made with other North Atlantic countries to provide 13 weather observation stations for this important flying region. The HMCS "St. Stephen," of the Royal Canadian Navy, is specially-equipped for these duties at a station midway between Labrador and Greenland, jointly operated with the United States. P.D. McTaggart-Cowan, assistant head of the Canadian meteorological service, who played an important part in setting up the flying forecasts



The Royal Canadian Air Force is responsible for the rescue of accident victims in remote areas of Canada, according to an ICAO world-wide plan. The demonstration above illustrates how a wounded man may be lifted from the ground or sea by a RCAF helicopter.

for the Atlantic Bridge, helped supervise the ICAO-sponsored weather reporting and forecasting system for the same air route after the war. Canadian Arctic and Newfoundland weather stations, recently established, are vital in this scheme. Mr. McTaggart-Cowan also played a prominent part in the establishment of ICAO's important Air Navigation Bureau.

The Canadian weather ship also transmits communications for Atlantic airliners as part of Canada's contribution to the North Atlantic air traffic control under ICAO. Headquarters of the Canadian communications for the North Atlantic is the centre at Moncton, New Brunswick, which bears the responsibility for giving pilots of all countries the necessary information to enable them to avoid collision in an area of the North Western Atlantic 43,000 miles square. Canada also participates in the joint operation of the Iceland long-range radar station under another ICAO-sponsored agreement. This station is an important means whereby the North Atlantic airliners navigate on their flights.

Another function of Canada's weather ship is to perform search and rescue operations in an emergency. Then it would co-ordinate with the RCAF which is responsible for such operations throughout Canada and its coastal waters. In accordance with ICAO world-wide recommendations in this field, the RCAF is specially trained and equipped with such equipment as helicopters and "Lancaster" bombers carrying lifeboats for these duties. The RCAF already has been called out on several "mercy flights."

Canada has undertaken to correct and amplify the aeronautical maps covering Canadian territory and make them accord with ICAO charts which will give uniformity throughout the world. The RCAF is now engaged in a gigantic mapping operation of the Canadian north country. In 1947 an area equivalent to the area of Ontario and Nova Scotia was mapped and in 1948 an even greater area is to be covered.

Another important ICAO activity which Canada with the United States has taken a leading part is pioneering in the removal and minimizing of obstacles to air travel at international boundaries. A very substantial contribution has been made by P.L. Young, Assistant Deputy Minister of National Revenue, on facilitation in the customs field; C.E.S. Smith, Commissioner for Immigration, on facilitation in regard to immigration matters; and Dr. C.P. Brown, of the Department of National Health and Welfare, in regard to facilitation in the health field.

CANADIAN WORK FOR AIR FREEDOM AT ICAO

A progressive course of action towards freeing the skies of the man-made prewar restrictions was set forth by Canada at the Chicago aviation meeting in 1944 which set up ICAO. Most countries agreed to the first two so-called Freedoms of the Air outlined by Canada. Although these Freedoms involve transit and landing rights, they do not mean surrender of sovereignty or bargaining rights. Nations are more careful of the Third and Fourth Freedoms, which cover the right to carry passengers and freight to and from the territory of a state of the aircraft and the territory of other countries. The real point of disagreement is over the Fifth Freedom, which allows pickup by through services for delivery to other states.

Canada has remained consistent in its firm support of the maximum attainable degree of international cooperation and regulation. Australian and New Zealand proposals at

Chicago for ownership and operation of international air lines by a company jointly owned by various nations were not disputed by Canada as an objective but were not found possible of general acceptance. Canadian representatives took the line that what should rather be sought was a set of principles to govern international aviation, with some means of ensuring that these principles would be enforced.

The chief problem in present international flying concerns the exchange between nations of traffic rights. To carry traffic into another country, a nation requires by custom a special bilateral agreement with that country. In consequence, the setting up of any major international air route involves from about half a dozen to a dozen separate bilateral agreements. The Canadian view is that this multiple system, which often results in discriminatory arrangements and is an impediment to the development of aviation, should be replaced by a system in which traffic rights will be exchanged freely on a multilateral basis. At the same time, the Canadian Government takes the stand that since obvious inequality exists in regard to the economic position of nations and in their consequent ability to operate major international air lines some general protection is required if lesser nations are to give up the protection presently afforded through bilateral bargaining.

This protection, in the Canadian view, should ensure that each nation would have a chance to operate an air line if it wishes, would not receive unfair treatment at the hands of other nations, and could not be driven out of business through unfair operations by the air lines of other nations. At the same time, the most efficient operator should get the best chance to operate and expand as a reward for efficiency.

Since the Chicago meeting, the Canadian Government has constantly sought an agreement which would cover these requirements. At Chicago, the discussion first centred upon the plan of having an international body which would have power to allocate international routes and regulate their operation. Subsequently the discussion turned to the idea of a clear set of principles to govern international aviation which each nation would agree to accept and follow, with an international body to enforce them and to settle grievances. Later discussions in Montreal at PICAQ and its successor, ICAO, produced various modifications of these ideas. The most recent attempt at Geneva in November of 1947 took the approach that routes should still be exchanged bilaterally but that there should be principles to govern both the fair exchange and the operation of routes.

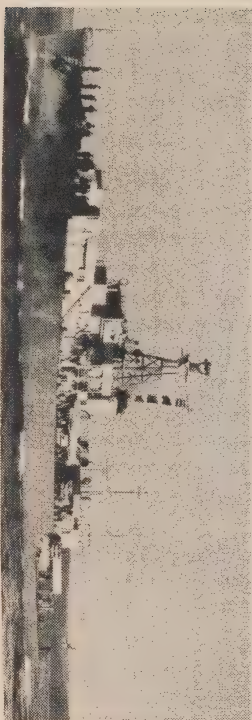
Each nation, it is generally recognized, is primarily interested in the carriage of "home" traffic travelling to or from its own territory. Also it is agreed that on long through routes traffic travelling between points other than the home territory of the service is essential to the economic operation of the air line. Yet if this "Fifth Freedom" traffic becomes too large it infringes upon the home traffic of some other nation's air line.

The countries primarily interested in long through operations naturally wish that all traffic rights be given freely with little restriction. Canada has made a condition for the giving of these complete traffic rights on a multilateral basis (or on a basis which as a result of a multilateral commitment compels each nation to give them bilaterally, which is the Geneva proposal). This condition is that in return for such rights definite rules would ensure reasonable operation of all routes, fair competition, no discrimination and no inroads on the originating or "home" traffic of each nation. So far these principles have not been provided and no agreement has been reached.

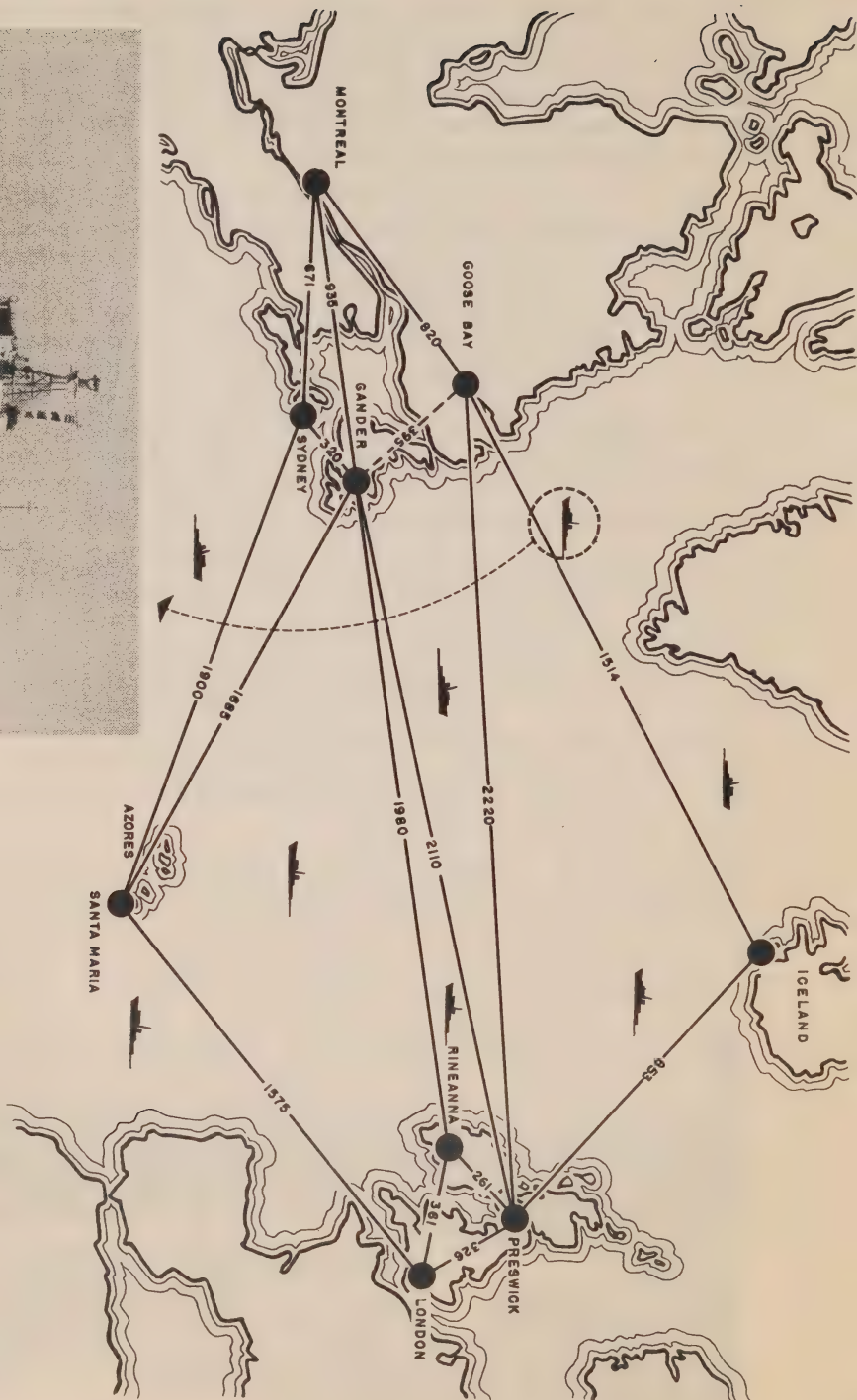
In the most recent discussions at Geneva, the proposal was made that routes should be exchanged through bilateral agreements but that these agreements should include full traffic rights (both "home" and "Fifth Freedom" traffic). The Canadian contention was that these agreements must be paralleled by a set of principles which would not only cover matters of capacity, rates and competition (which was done) but would also give to each nation a reasonable assurance that it would not be refused reasonable routes by other countries (which was not done).

As a result of the tremendous expansion of Canadian flying during the last war, many modern airports similar to that at Edmonton shown below were built or greatly improved. Through Edmonton pass some of the shortest air routes across the roof of the world to the Orient. More commercial air freight goes in and out of this airport than any other on the continent. Canadian air policy encourages unrestricted flying throughout the globe.





Canadian ocean weather station: H.M.C.S. St. Stephen, weather ship of the Royal Canadian Navy, with its position in the International Civil Aviation Organization weather station plan for the North Atlantic.



CANADA'S ATLANTIC AIR ROUTES

AND LOCATION OF WEATHER OBSERVATION STATIONS

ALL DISTANCES ARE IN STATUTE MILES.



CANADA'S POLICY ABROAD

The concepts behind Canada's stand in international civil aviation are common to many states:

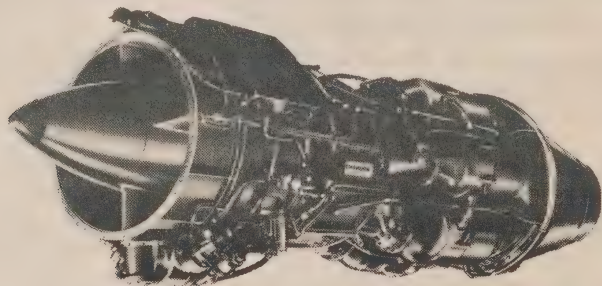
- 1) the sovereignty of every state in the air above it;
- 2) international regulation of world air routes in place of restrictive national barriers;
- 3) competitive conditions which permit rewards for efficient operation of air lines;
- 4) prevention of cut-throat competition between air lines of different states; and
- 5) maintenance of the principle of nondiscrimination and equal opportunity of all states to share in the world's air traffic.

Canada has already accepted the Transit Agreement, covering the first two Freedoms of the Air, in the belief that its action would contribute to the cause of world peace. In so doing it gave up the bargaining power its broad expanses might give in restricting the flight of others. Any country may now land in and fly over Canadian territories. The traffic rights of Freedoms Three, Four and Five are still reserved by Canada for bilateral agreements.

The Canadian Government, while continuously striving for a multilateral agreement which would remove or reduce the necessity for bilaterals, has nevertheless produced, with the development of its own international services and the conclusion of its bilateral agreements, a fairly consistent pattern. Canada has agreements with the United Kingdom, Ireland and Newfoundland covering operations across the North Atlantic to each of these countries. It has an agreement with the United Kingdom providing for the operation of a Canadian air service to Bermuda and British territories in the West Indies. There is an agreement with the United States by which numerous trans-border routes are exchanged. Another agreement is with Australia and in principle with New Zealand covering the operation of a trans-Pacific air service. Canada also has agreements with Portugal and Sweden although no services are operated to these countries (except for a stop at the Azores on the alternate Atlantic route). Other agreements are at present under negotiation.



Specially-designed for bulky freight carrying is the Canadian-made Loadmaster, a double-tailed aircraft. It may also carry passengers.



This is Canada's first turbo-jet aircraft engine, which has had satisfactory initial running tests at its manufacturing plant at Toronto. This engine is but the forerunner of others now in the design stage.



The Canadian-made Beaver was specially designed by Canadians for bush flying. It may be used as a cargo or passenger plane and fitted with pontoons, skis or wheels.

TOWARDS ONE WORLD IN THE AIR

The progressive development of civil aviation in Canada has meant that the country's vast distances are becoming less formidable obstacles to national vision and enterprise. The benefits of aviation---fast, regular, economical and safe travel, speedy air mail and air freight, have contributed greatly to national development. Because of the country's plans for new international routes, Canadians will get the chance of knowing the rest of the world as well as they have become acquainted with other parts of Canada by air. Canada's international aviation policy is a contribution to the desire for "One World in the Air".

The Canadian-designed and made Chipmunk flies over the Canadian-United States boundary at Niagara Falls. Border restrictions for air travellers between these two countries have been cut to a minimum, setting an example for the whole world.





Here is the partially-completed first helicopter to be built in Canada with its pilot and designers. Because of the nature of the country and other factors, Canada is considered to be a good place to mass produce these machines.

Reproduction of this booklet in whole or in part is welcomed. Additional information on Canadian aviation may be obtained in Canada through the Department of Transport, Ottawa, or through the nearest Canadian mission abroad. Copies of photographs or maps used in this booklet are also obtainable.

Thanks are due to the many persons and organizations who have allowed the use of their photographs in this booklet. These include:

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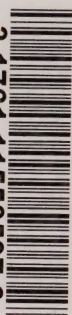
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